



# Versatile Interface Processor (VIP6-80) Installation and Configuration Guide

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**Product Numbers:** VIP6-80(=), MEM-VIP6-64M-SD(=), MEM-VIP6-128M-SD(=), MEM-VIP6-256M-SD(=)

**Customer Order Number** DOC-7814372=

## Introduction

This document describes the Versatile Interface Processor (VIP6-80), an option available for use with the Cisco 7500 series and the Cisco 7000 series routers using the 7000 Series Route Switch Processor (RSP7000) and 7000 Series Chassis Interface (RSP7000CI). The VIP6-80 improves high-performance switching over previous generation VIPs.

The VIP6-80 supports online insertion and removal (OIR), a feature that allows you to remove and replace a VIP6-80 without first shutting down the system. However, the VIP6-80 does not support OIR of port adapters (PAs). The VIP6-80 must be removed before removing or installing the port adapter.

The VIP6-80 also supports Single Line Card Reload, a feature that reloads a failed line card on the network backplane without reloading other line cards. Refer to the [“Single Line Card Reload” section on page 32](#) for more information.

The VIP6-80 supports any combination of LAN and WAN PAs, including Fast Ethernet, T1/E1, High-Speed Serial Interface (HSSI), T3/E3, T3/E3 ATM, multichannel T1/E1, multichannel T3/E3, OC-3 ATM, Packet over SONET (POS), and OC-12 ATM. For a list of supported port adapters, refer to the [“Port Adapter Slots” section on page 7](#).

## Contents

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- [Related Documentation, page 2](#)
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## Related Documentation

Your router and the Cisco IOS software running on it contain extensive features and functionality, which are documented in the following resources:

- Cisco IOS software:

For configuration information and support, refer to the modular configuration and modular command reference publications in the Cisco IOS software configuration documentation set that corresponds to the software release installed on your Cisco hardware.



### Note

You can access Cisco IOS software configuration and hardware installation and maintenance documentation on the World Wide Web at <http://www.cisco.com>. Translated documentation is available at the following URL: [http://www.cisco.com/public/countries\\_languages.shtml](http://www.cisco.com/public/countries_languages.shtml).

- Cisco microcode:

For information on upgrading microcode in Cisco 7500 series routers, see the Cisco IOS Configuration Fundamentals Configuration Guides for the mainline software release that you are running. For information on upgrading software and microcode in Cisco 7000 series routers, refer to the manual *Upgrading Software and Microcode in Cisco 7000 Series Routers*, available online at [http://www.cisco.com/univercd/cc/td/doc/product/software/ssr921/7k\\_921cn/54755.htm](http://www.cisco.com/univercd/cc/td/doc/product/software/ssr921/7k_921cn/54755.htm).

- Cisco 7000 series routers:

For hardware installation and maintenance information on the Cisco 7000 series routers, refer to the *Cisco 7000 Hardware Installation and Maintenance* guide available online at [http://www.cisco.com/univercd/cc/td/doc/product/core/cis7000/7000\\_him/index.htm](http://www.cisco.com/univercd/cc/td/doc/product/core/cis7000/7000_him/index.htm).

- Cisco 7500 series routers:

For hardware installation and maintenance information on the Cisco 7500 series routers, refer to the *Cisco 7500 Installation and Configuration Guide* available online at <http://www.cisco.com/univercd/cc/td/doc/product/core/cis7505/cicg7500/index.htm>.

- For international agency compliance, safety, and statutory information for WAN interfaces:
  - *Site Preparation and Safety Guide* online at [http://www.cisco.com/univercd/cc/td/doc/product/lan/cat4000/hw\\_doc/safety/index.htm](http://www.cisco.com/univercd/cc/td/doc/product/lan/cat4000/hw_doc/safety/index.htm)

- *Regulatory Compliance and Safety Information for the Cisco 7500 Series Routers* online at <http://www.cisco.com/univercd/cc/td/doc/product/core/cis7505/4194pc75.htm>
- *Regulatory Compliance and Safety Information for the Cisco 7000 Series Routers* online at <http://www.cisco.com/univercd/cc/td/doc/product/core/cis7000/4195pc70.htm>
- Port adapters/interface processors/service adapters:  
For port adapter information and maintenance information, refer to the specific port adapter installation and configuration guide. See the port adapter index online at <http://www.cisco.com/univercd/cc/td/doc/product/core/cis7505/portadpt/index.htm>.
- To view Cisco documentation or obtain general information about the documentation, refer to the following sources:
  - “Obtaining Documentation” section on page 37
  - “Obtaining Additional Publications and Information” section on page 39

## Product Description

The topics discussed in this section are as follows:

- [CPU, page 5](#)
- [Memory Components, page 5](#)
- [LEDs, page 6](#)
- [Jumpers, page 6](#)
- [Microcode, page 6](#)
- [ROM Monitor, page 6](#)
- [Port Adapter Slots, page 7](#)
- [Specifications, page 9](#)
- [System Software, page 9](#)
- [Traffic Management, page 10](#)

The VIP6-80 is available for use as an option with the Cisco 7505, Cisco 7507, Cisco 7507-MX, Cisco 7513, Cisco 7513-MX, Cisco 7576, and the Cisco 7000 series routers. The VIP6-80 is not currently available as an upgrade to an existing VIP.

The VIP6-80 has a main processor and memory. When distributed switching is enabled on the router, the VIP6-80 can make packet switching decisions to help reduce the load on the Route Switch Processor (RSP). Interfaces located on port adapters that fit into the VIP6-80 connect the router to the external network. Either one dual-width or two single-width PAs can be used on the VIP6-80. See the “[Port Adapter Slots](#)” section on page 7 for more information.

The VIP6-80 supports OIR. VIP6-80 PAs do not support OIR, so you must first remove the VIP6-80 before removing or installing the PAs.

The VIP6-80 also supports Single Line Card Reload (SLCR), a feature which speeds recovery of a failed router by reloading a failed line card without reloading other line cards on the network backplane. For more information, refer to “[Single Line Card Reload](#)” section on page 32.

[Table 1](#) outlines features of the VIP6-80 model.

**Table 1**     **VIP6-80 Features**

<b>Product</b>	<b>Packets Forwarding (PPS)<sup>1</sup></b>	<b>Bandwidth</b>	<b>Distributed Switching/ Services (DSW)</b>	<b>Usage</b>
VIP6-80	~ 140,000 - 215,000	750+ MB	Yes; Very high DSW	High distributed switching performance Multiple high-speed PAs with high link utilization Extensive use of distributed IP services Cisco Content Networking (CCN)

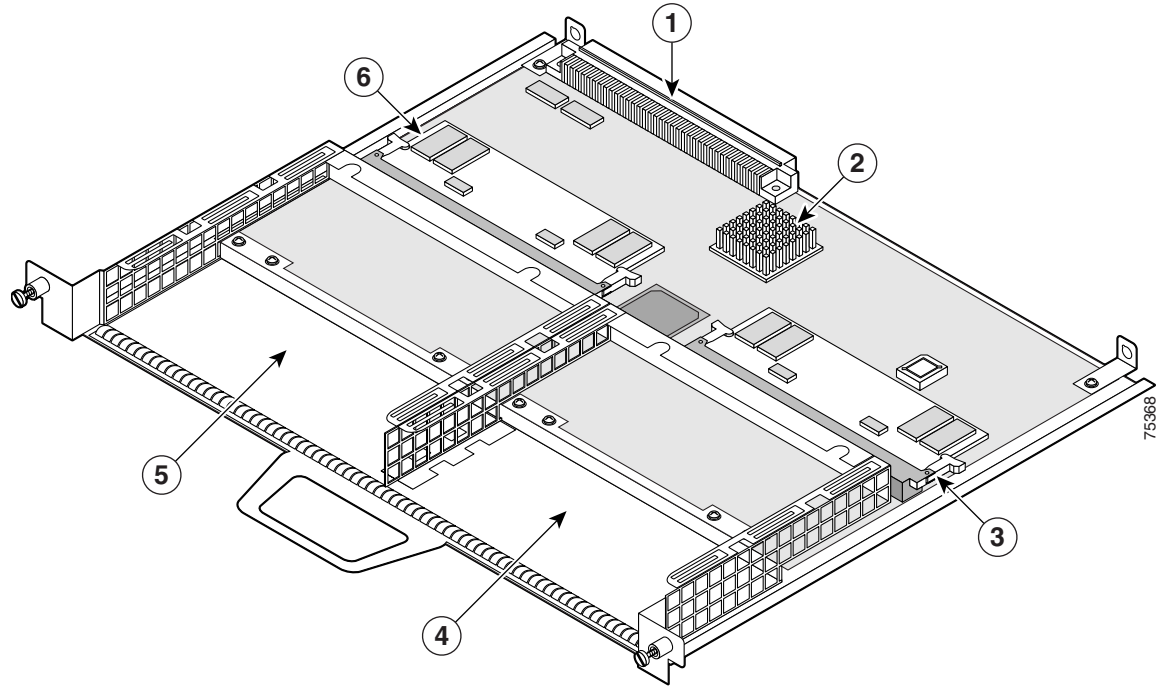
1. PPS = packets per second

The VIP6-80 installs in any of the following interface processor slots on your router:

- Slots 0, 1, 2, 3, or 4 in the Cisco 7000 router
- Slots 0, 1, or 2 in the Cisco 7010 router
- Slots 0, 1, 2, or 3 in the Cisco 7505 router
- Slots 0, 1, 4, 5, or 6 in the Cisco 7507 router
- Slots 0, 1, 2, 3, 4, or 5, and 8, 9, 10, 11, or 12 in the Cisco 7513 router
- Slots 0, 1, 2, 3, 4, or 5 of Router A, and slots 8, 9, 10, 11, or 12 of Router B in the Cisco 7576 router

For more information on interface processor slots on your router, refer to the *Cisco 7500 Series Installation and Configuration Guide* or the appropriate Quick Start Guide for the Cisco 7500 series routers, or refer to the *Cisco 7000 Hardware Installation and Maintenance* guide for the Cisco 7000 series routers.

**Figure 1** VIP6-80



<b>1</b>	Bus connector	<b>4</b>	Port adapter slot 1
<b>2</b>	CPU	<b>5</b>	Port adapter slot 0
<b>3</b>	SDRAM DIMM (program or CPU memory) U1	<b>6</b>	SDRAM DIMM (packet memory) U5

## CPU

**Table 2** CPU

Type	Size	Description	Location (See <a href="#">Figure 1.</a> )
CPU	400 megahertz (MHz) internal operating frequency	Reduced Instruction Set Computer (RISC), MIPS R7000 processor	CPU

## Memory Components

You can use any combination of available CPU memory configurations and packet memory configurations on the VIP6-80. You do not need to have equal amounts of CPU memory and packet memory installed. (For information about upgrading memory, see the [“Upgrading VIP6-80 Memory”](#) section on page 32.) For a description of memory components, see [Table 3](#).

**Table 3** Memory Components

Type	Size	Description	Location (See Figure 1.)
SDRAM DIMMs <sup>1</sup> (program or CPU memory)	64 (default), 128, or 256 MB	100-MHz synchronous dynamic random-access memory (SDRAM) as CPU memory contained on dual in-line memory modules (DIMMs)	U1
SDRAM DIMMs <sup>1</sup> (packet memory)	64 MB (default)	100-MHz synchronous dynamic random-access memory (SDRAM) as packet memory contained on dual in-line memory modules (DIMMs)	U5

1. 8-bit error correction code (ECC), rather than byte parity, for single error-bit correction and double error-bit detection

## LEDs

The VIP6-80 has LEDs; however, they are not be visible once the VIP is installed in the Cisco 7500 or the Cisco 7000 router. The port adapters that fit into the VIP do have visible LEDs. Refer to the Installation and Configuration Guide for your specific port adapter for more information.

## Jumpers

There are no user-configurable jumpers on the VIP6-80.

## Microcode

The Cisco 7500 and Cisco 7000 series routers support downloadable microcode, which enables you to upgrade microcode versions by downloading new microcode images, storing them in system Flash memory, and instructing the system to load its image from Flash memory. You can store multiple images for an interface type, such as the VIP6-80, and, with a configuration command, instruct the system to load any one of them or the default microcode image. Although multiple microcode versions for a specific interface type can be stored concurrently in Flash memory, only one image can load at startup.

The **show controllers cbus** command displays the currently loaded and running microcode version for each interface processor and the VIP6-80. The **show startup-config EXEC** command shows the current system instructions for loading microcode at startup.

Software and interface processor microcode images are bundled to work together. Overriding the bundle can result in system incompatibilities. We recommend that you use the microcode included in the software bundle. For information on upgrading software and microcode in Cisco 7500 series routers, see the Cisco IOS Software Configuration Fundamentals Configuration Guides for the mainline software release that you are running.

## ROM Monitor

The VIP6-80 read-only memory (ROM) monitor, known as Rommon, is firmware. It runs a brief set of system diagnostics, initializes the VIP6-80 hardware, and downloads a copy of the Cisco IOS image. The ROM monitor loads the Cisco IOS image from Flash memory or from a TFTP server. While multiple Cisco IOS images can be stored in RSP Flash memory, just one can be loaded at system startup.

The VIP6-80 ROM monitor functions similarly to the boot loader image on the RSP, which runs a copy of the Cisco IOS image. The boot loader image allows the router to access the Cisco IOS image when powering up or initializing the system.

## Port Adapter Slots

The VIP6-80 supports up to two single-width port adapters, or one dual-width port adapter. [Figure 1](#) shows a VIP6-80 with two single-width port adapter slots. A dual-width port adapter occupies both port adapter slots (not shown).

To ensure proper airflow in the router and compliance with EMI prevention standards, a VIP6-80 with one single-width port adapter must have a blank port adapter installed in the empty port adapter slot location.

VIP6-80 does not support OIR of PAs. To install or replace port adapters, first remove the VIP6-80.



**Note**

A VIP6-80 without at least one installed port adapter is not supported.

The VIP6-80 does not support the PA-GE.

[Table 4](#) identifies the port adapters supported by the VIP6-80 at the time of this writing.



**Note**

The following table does not address which software release applies to the VIP6-80 port adapters. For more information, refer to the Software Advisor at <http://www.cisco.com/cgi-bin/Support/CompNav/Index.pl>.

**Table 4** Port Adapters Supported by the VIP6-80

Product Number	Description	Number of Ports	Single or Dual Width
PA-A3-T3	ATM DS3 port adapter, enhanced	1	Single
PA-A3-E3	ATM E3 port adapter, enhanced	1	Single
PA-A3-8T1IMA	ATM inverse multiplexer over ATM port adapter	8	Single
PA-A3-8E1IMA	ATM inverse multiplexer over ATM port adapter	8	Single
PA-A3-OC3MM	ATM OC-3c/STM-1 multimode, enhanced	1	Single
PA-A3-OC3SMI	ATM OC-3c/STM-1 single-mode intermediate reach (IR), enhanced	1	Single
PA-A3-OC3SML	ATM OC-3c/STM-1 single-mode long reach (LR), enhanced	1	Single
PA-A3-OC12-MM	ATM OC-12/STM-4 single-mode intermediate reach (IR); multimode	1	Dual
PA-A3-OC12-SMI	ATM OC-12/STM-4 single-mode intermediate reach (IR); multimode	1	Dual
PA-POS-OC3-MM	Single-wide OC-3c/STM-1	1	Single
PA-POS-OC3-SMI	Single-wide OC-3c/STM-1	1	Single
PA-POS-OC3-SML	Single-wide OC-3c/STM-1	1	Single
PA-FE-TX	Fast Ethernet 100BaseTX	1	Single
PA-FE-FX	Fast Ethernet 100BaseFX	1	Single
PA-2FE-TX	Dual-Port Fast Ethernet 100BaseTX	2	Single

**Table 4 Port Adapters Supported by the VIP6-80 (Continued)**

<b>Product Number</b>	<b>Description</b>	<b>Number of Ports</b>	<b>Single or Dual Width</b>
PA-2FE-FX	Dual-Port Fast Ethernet 100BaseFX	2	Single
PA-4E	Ethernet 10BaseT	4	Single
PA-8E	Ethernet 10BaseT	8	Single
PA-F-MM	FDDI Multimode	1	Single
PA-F-SM	FDDI Single-Mode	1	Single
PA-FD-MM	FDDI Full Duplex Multimode	1	Single
PA-FD-SM	FDDI Full Duplex Single-mode	1	Single
PA-4T+	Serial, Enhanced	4	Single
PA-8T-V35	Serial, V.35	8	Single
PA-8T-232	Serial, RS232	8	Single
PA-8T-X21	Serial, X.21	8	Single
PA-T3/PA-T3+	T3 Serial Interface	1	Single
PA-2T3/ PA-2T3+	T3 Serial Interface	2	Single
PA-E3	E3 Serial Interface	1	Single
PA-2E3	E3 Serial Interface	2	Single
PA-4E1G/75	E1 G.703 Serial (75 ohm/Unbalanced)	4	Single
PA-4E1G/120	E1 G.703 Serial (120 ohm/Balanced)	4	Single
PA-MC-T3	Multichannel T3	1	Single
PA-MC-E3	Multichannel E3	1	Single
PA-MC-2T1	Multichannel DS1/PRI T1 (100 ohm)	2	Single
PA-MC-4T1	Multichannel DS1/PRI T1 (100 ohm)	4	Single
PA-MC-8T1	Multichannel DS1/PRI T1 (100 ohm)	8	Single
PA-MC-2T3+	Multichannel with two T3 interfaces	2	Single
PA-MC-8DSX1	Multichannel DS1/PRI T1 (100 ohm)	8	Single
PA-MC-2E1/120	Multichannel E1 with G.703 120-ohm interface	2	Single
PA-MC-8E1/120	Multichannel E1 with G.703 120-ohm interface	8	Single
PA-MC-STM-1MM	Multichannel STM-1 Port Adapter	1	Single
PA-MC-STM-1SMI <sup>1</sup>	Multichannel STM-1 Port Adapter	1	Single
PA-H	HSSI	1	Single
PA-2H	HSSI	2	Single
PA-SRP-OC12MM <sup>2</sup>	Multimode fiber	2	Dual
PA-SRP-OC12SMI <sup>2</sup>	Single-mode fiber, intermediate reach	2	Dual
PA-SRP-OC12SML <sup>2</sup>	Single-mode fiber, long reach	2	Dual
PA-SRP-OC12SMX <sup>2</sup>	Single-mode fiber, extended reach	2	Dual

1. Supported only on the Cisco VIP6-80.

2. Requires Cisco IOS 12.1(12)E or later or Cisco IOS 12.1(22)S or later.



**Note**

All interface processors are dual-width.

For more information on the available port adapters, interface processors, and service adapters supported by the VIP6-80, refer to the *Cisco Product Catalog* online, or contact a Cisco sales representative. For more information on a specific port adapter, refer to the specific port adapter installation and configuration guide. The port adapters, including part numbers for ordering, are listed in the *Cisco Port Adapter Documentation* flyer. This document is available online at [http://www.cisco.com/en/US/docs/interfaces\\_modules/port\\_adapters/roadmaps/11022pa.html](http://www.cisco.com/en/US/docs/interfaces_modules/port_adapters/roadmaps/11022pa.html).

## Specifications

The VIP6-80 physical specifications are listed in [Table 5](#).

**Table 5**     **VIP6-80 Specifications**

Description	Specifications
Physical dimensions	The VIP6-80 occupies one chassis slot and can only be operated in Cisco 7500 series or Cisco 7000 series routers using the 7000 Series Route Switch Processor (RSP7000) and 7000 Series Chassis Interface (RSP7000CI)
Shipping weight	5 lb (2.25 kg)
Operating temperature	32 to 104°F (0 to 40°C)
Relative humidity	10 to 90 percent, noncondensing
Storage temperature	−4 to 149°F (−20 to 65°C)

## System Software

The Cisco 7505, Cisco 7507, Cisco 7507-MX, Cisco 7513, Cisco 7513-MX, and Cisco 7576 routers support downloadable system software and microcode for most Cisco IOS and microcode upgrades. This enables you to remotely download, store, and boot from a new image. For information on upgrading software and microcode in Cisco 7500 series routers, see the Cisco IOS Configuration Fundamentals Configuration Guides for the mainline software release that you are running.

The Cisco IOS software images reside in Flash memory, in the form of a dual in-line memory module (DIMM). Flash memory contains the default system software image and bundled microcode images. Storing the Cisco IOS images in Flash memory enables you to download and boot from upgraded Cisco IOS images remotely or from software images resident in the VIP6-80 Flash memory.

For the latest software release information, refer to the Software Advisor at <http://www.cisco.com/cgi-bin/Support/CompNav/Index.pl>.

At system startup, an internal system utility scans for compatibility problems between the installed interface processor types and the bundled microcode images. The utility then decompresses the images into running dynamic random-access memory (DRAM). The bundled microcode images then function the same as the EPROM images.

## Traffic Management

The VIP6-80 supports the following:

- Simple Network Management Protocol (SNMP) agent V1 (RFCs 1155–1157)
- Management Information Base (MIB) II (RFC 1213)

## Installation Prerequisites

This section provides installation prerequisites to ensure a successful VIP6-80 installation, and includes the following sections:

- [Software Requirements, page 10](#)
- [Hardware Requirements, page 10](#)
- [Microcode Requirements, page 11](#)
- [Tools and Parts Required, page 11](#)
- [Agency Approvals, page 11](#)
- [Safety Guidelines, page 11](#)

## Software Requirements

The minimum Cisco IOS Release requirements for VIP6-80 are listed in [Table 6](#). For configuration information and support, refer to the modular configuration and modular command reference publications in the Cisco IOS software configuration documentation set that corresponds to the software release installed on your Cisco hardware.



### Note

You can access Cisco IOS software configuration and hardware installation and maintenance documentation on the World Wide Web at <http://www.cisco.com>. Translated documentation is available at the following URL: [http://www.cisco.com/public/countries\\_languages.shtml](http://www.cisco.com/public/countries_languages.shtml).

**Table 6** VIP6-80 Minimum Software Release Requirements

VIP Release	Minimum Cisco IOS Supported Releases
VIP6-80	Cisco IOS Release 12.0(22)S or later release of Cisco IOS Release 12.0 S Cisco IOS Release 12.1(12)E or later release of Cisco IOS Release 12.1 E Cisco IOS Release 12.2(12)T or later release of Cisco IOS Release 12.2 T

## Hardware Requirements

The VIP6-80 is a single motherboard. It operates with the following:

- Cisco 7505, Cisco 7507, Cisco 7507-MX, Cisco 7513, Cisco 7513-MX, and the Cisco 7576 routers with the Route Switch Processor (RSP1, RSP2, RSP4, RSP4+, RSP8, or RSP16); the RSP should have at least 64 MB of DRAM

- Cisco 7000 series routers with the 7000 Series Route Switch Processor (RSP7000) and 7000 Series Chassis Interface (RSP7000CI); the RSP7000 should have at least 64 MB of DRAM
- Two single-width port adapters, or one dual-width port adapter, supporting multiple LAN and WAN port adapter types, including Ethernet, Fast Ethernet, Gigabit Ethernet, serial, channelized serial, multichannel, HSSI, ATM, and POS

**Note**

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The VIP6-80 requires at least one port adapter installed in order to be supported. A single-width port adapter must have a blank port adapter installed in the empty port adapter slot location.

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## Microcode Requirements

Upgradable microcode on each interface processor contains board-specific software instructions. These microcode images come bundled with Cisco IOS software, and the images load automatically when a new software image is installed. (New microcode provides additional features and enhancements to interface processors.) Each Cisco IOS release works to optimize the bundled microcode images.

## Tools and Parts Required

You need the following tools and parts to install or upgrade a VIP6-80:

- VIP6-80 (For specific compatibility requirements, see the “[Software Requirements](#)” section on [page 10](#).)
- Number 1 Phillips and a 3/16-inch flat-blade screwdriver
- ESD-prevention equipment or disposable grounding wrist strap, included with all Cisco products

**Note**

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The VIP6-80 requires at least one port adapter installed in order to be supported. A single-width port adapter must have a blank port adapter installed in the empty port adapter slot location.

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If you need additional equipment, contact a service representative for ordering information.

## Agency Approvals

The VIP6-80 complies with the 89/366/EEc and 73/23/EEC directives, which can be found in the *Regulatory Compliance and Safety Information for the Cisco 7500 Series Routers* guide online at <http://www.cisco.com/univercd/cc/td/doc/product/core/cis7505/4194pc75.htm>.

## Safety Guidelines

Following are safety guidelines that you should apply when working with any equipment that connects to electrical power or telephone wiring.

## Safety Warnings

Safety warnings appear throughout this publication in procedures that, if performed incorrectly, may harm you. A warning symbol precedes each warning statement.



### Warning

This warning symbol means *danger*. You are in a situation that could cause bodily injury. Before you work on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents. To see translations of the warnings that appear in this publication, refer to the *Regulatory Compliance and Safety Information* document that accompanied this device.

### Waarschuwing

Dit waarschuwingssymbool betekent gevaar. U verkeert in een situatie die lichamelijk letsel kan veroorzaken. Voordat u aan enige apparatuur gaat werken, dient u zich bewust te zijn van de bij elektrische schakelingen betrokken risico's en dient u op de hoogte te zijn van standaard maatregelen om ongelukken te voorkomen. Voor vertalingen van de waarschuwingen die in deze publicatie verschijnen, kunt u het document *Regulatory Compliance and Safety Information* (Informatie over naleving van veiligheids- en andere voorschriften) raadplegen dat bij dit toestel is ingesloten.

### Varoitus

Tämä varoitusmerkki merkitsee vaaraa. Olet tilanteessa, joka voi johtaa ruumiinvammaan. Ennen kuin työskentelet minkään laitteiston parissa, ota selvää sähkökytkentöihin liittyvistä vaaroista ja tavanomaisista onnettomuuksien ehkäisykeinoista. Tässä julkaisussa esiintyvien varoitusten käännökset löydät laitteen mukana olevasta *Regulatory Compliance and Safety Information* -kirjastesta (määräysten noudattaminen ja tietoa turvallisuudesta).

### Attention

Ce symbole d'avertissement indique un danger. Vous vous trouvez dans une situation pouvant causer des blessures ou des dommages corporels. Avant de travailler sur un équipement, soyez conscient des dangers posés par les circuits électriques et familiarisez-vous avec les procédures couramment utilisées pour éviter les accidents. Pour prendre connaissance des traductions d'avertissements figurant dans cette publication, consultez le document *Regulatory Compliance and Safety Information* (Conformité aux règlements et consignes de sécurité) qui accompagne cet appareil.

### Warnung

Dieses Warnsymbol bedeutet Gefahr. Sie befinden sich in einer Situation, die zu einer Körperverletzung führen könnte. Bevor Sie mit der Arbeit an irgendeinem Gerät beginnen, seien Sie sich der mit elektrischen Stromkreisen verbundenen Gefahren und der Standardpraktiken zur Vermeidung von Unfällen bewusst. Übersetzungen der in dieser Veröffentlichung enthaltenen Warnhinweise finden Sie im Dokument *Regulatory Compliance and Safety Information* (Informationen zu behördlichen Vorschriften und Sicherheit), das zusammen mit diesem Gerät geliefert wurde.

### Avvertenza

Questo simbolo di avvertenza indica un pericolo. La situazione potrebbe causare infortuni alle persone. Prima di lavorare su qualsiasi apparecchiatura, occorre conoscere i pericoli relativi ai circuiti elettrici ed essere al corrente delle pratiche standard per la prevenzione di incidenti. La traduzione delle avvertenze riportate in questa pubblicazione si trova nel documento *Regulatory Compliance and Safety Information* (Conformità alle norme e informazioni sulla sicurezza) che accompagna questo dispositivo.

- Advarsel** Dette varselsymbolet betyr fare. Du befinner deg i en situasjon som kan føre til personskade. Før du utfører arbeid på utstyr, må du være oppmerksom på de faremomentene som elektriske kretser innebærer, samt gjøre deg kjent med vanlig praksis når det gjelder å unngå ulykker. Hvis du vil se oversettelser av de advarslene som finnes i denne publikasjonen, kan du se i dokumentet *Regulatory Compliance and Safety Information* (Overholdelse av forskrifter og sikkerhetsinformasjon) som ble levert med denne enheten.
- Aviso** Este símbolo de aviso indica perigo. Encontra-se numa situação que lhe poderá causar danos físicos. Antes de começar a trabalhar com qualquer equipamento, familiarize-se com os perigos relacionados com circuitos eléctricos, e com quaisquer práticas comuns que possam prevenir possíveis acidentes. Para ver as traduções dos avisos que constam desta publicação, consulte o documento *Regulatory Compliance and Safety Information* (Informação de Segurança e Disposições Reguladoras) que acompanha este dispositivo.
- ¡Advertencia!** Este símbolo de aviso significa peligro. Existe riesgo para su integridad física. Antes de manipular cualquier equipo, considerar los riesgos que entraña la corriente eléctrica y familiarizarse con los procedimientos estándar de prevención de accidentes. Para ver una traducción de las advertencias que aparecen en esta publicación, consultar el documento titulado *Regulatory Compliance and Safety Information* (Información sobre seguridad y conformidad con las disposiciones reglamentarias) que se acompaña con este dispositivo.

## Electrical Equipment Guidelines

Follow these basic guidelines when working with any electrical equipment:

- Before beginning any procedures requiring access to the router interior, locate the emergency power-off switch for the room in which you are working.
- Disconnect all power and external cables before moving a router.
- Do not work alone when potentially hazardous conditions exist.
- Never assume that power has been disconnected from a circuit; always check.
- Do not perform any action that creates a potential hazard or makes the equipment unsafe.
- Carefully examine your work area for possible hazards such as moist floors, ungrounded power extension cables, and missing safety grounds.

## Telephone Wiring Guidelines

Use the following guidelines when working with any equipment that is connected to telephone wiring or to other network cabling:

- Never install telephone wiring during a lightning storm.
- Never install telephone jacks in wet locations unless the jack is specifically designed for wet locations.
- Never touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.
- Use caution when installing or modifying telephone lines.

## Preventing Electrostatic Discharge Damage

Electrostatic discharge (ESD) damage, which can occur when electronic cards or components are improperly handled, results in complete or intermittent failures.

Use the following guidelines for preventing ESD damage:

- Always use an ESD wrist or ankle strap and ensure that it makes good skin contact.
- Connect the equipment end of the strap to an unfinished chassis surface.
- When installing a component, use any available ejector levers or captive installation screws to properly seat the bus connectors in the backplane.
- When removing a component, use any available ejector levers or captive installation screws to release the bus connectors from the backplane or midplane.
- Handle carriers by available handles or edges only; avoid touching the printed circuit boards or connectors.
- Place a removed board component-side-up on an antistatic surface or in a static shielding container.
- Avoid contact between the printed circuit boards and clothing. The wrist strap only protects components from ESD voltages on the body; ESD voltages on clothing can still cause damage.
- Never attempt to remove the printed circuit board from the metal carrier.



---

**Caution**

For safety, periodically check the resistance value of the antistatic strap. The measurement should be between 1 and 10 megohms (Mohms).

---

# Guidelines for Removal and Installation

This section describes the correct procedures to avoid unnecessary board failures.



## Note

---

The VIP6-80 installation is the same for each router model, except where otherwise noted.

---

The VIP6-80 is oriented horizontally in the Cisco 7010 and Cisco 7505 routers, and vertically in the Cisco 7000, Cisco 7507, Cisco 7507-MX, Cisco 7513, Cisco 7513-MX, and Cisco 7576 routers.

Follow these guidelines when removing and installing the VIP6-80:

- Install VIP6-80s in the interface processor slots closest to the RSP slots first, and then work out to the interface processor slots furthest from the RSP slots to ensure compliance with EMI approvals.
- Remove or insert only one VIP at a time. Allow the system time to complete the initialization process before removing or inserting another VIP. Disrupting the sequence can cause the system to detect spurious hardware failures.
- Remove any interface processors before removing and installing any PAs.
- Handle processor modules by the carrier handles and carrier edges only; never touch the board or any connector pins. (See [Figure 2](#).)
- Use the ejector levers when removing the VIP6-80 to ensure that the backplane connector pins disconnect from the interface processor in the proper sequence. A VIP6-80 that is only partially connected to the backplane can hang the bus.
- Use the ejector levers when inserting the VIP6-80, as shown in [Figure 3](#). Failure to do so can disrupt the order in which the pins make contact with the VIP6-80, and may cause the system to interpret a board failure.
- Insert an interface processor filler in any unused interface processor slots to keep dust out of the router and to maintain proper airflow through the interface processor compartment.

**Figure 2** *Handling Interface Processors—Vertical Orientation Shown*

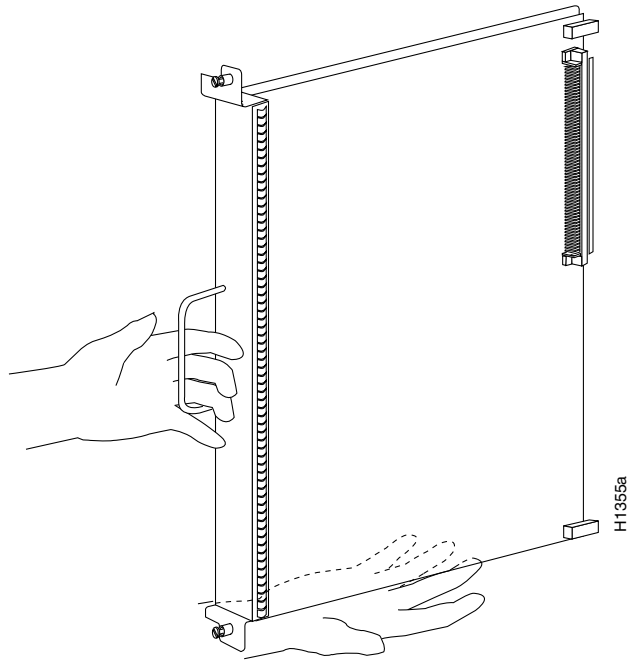
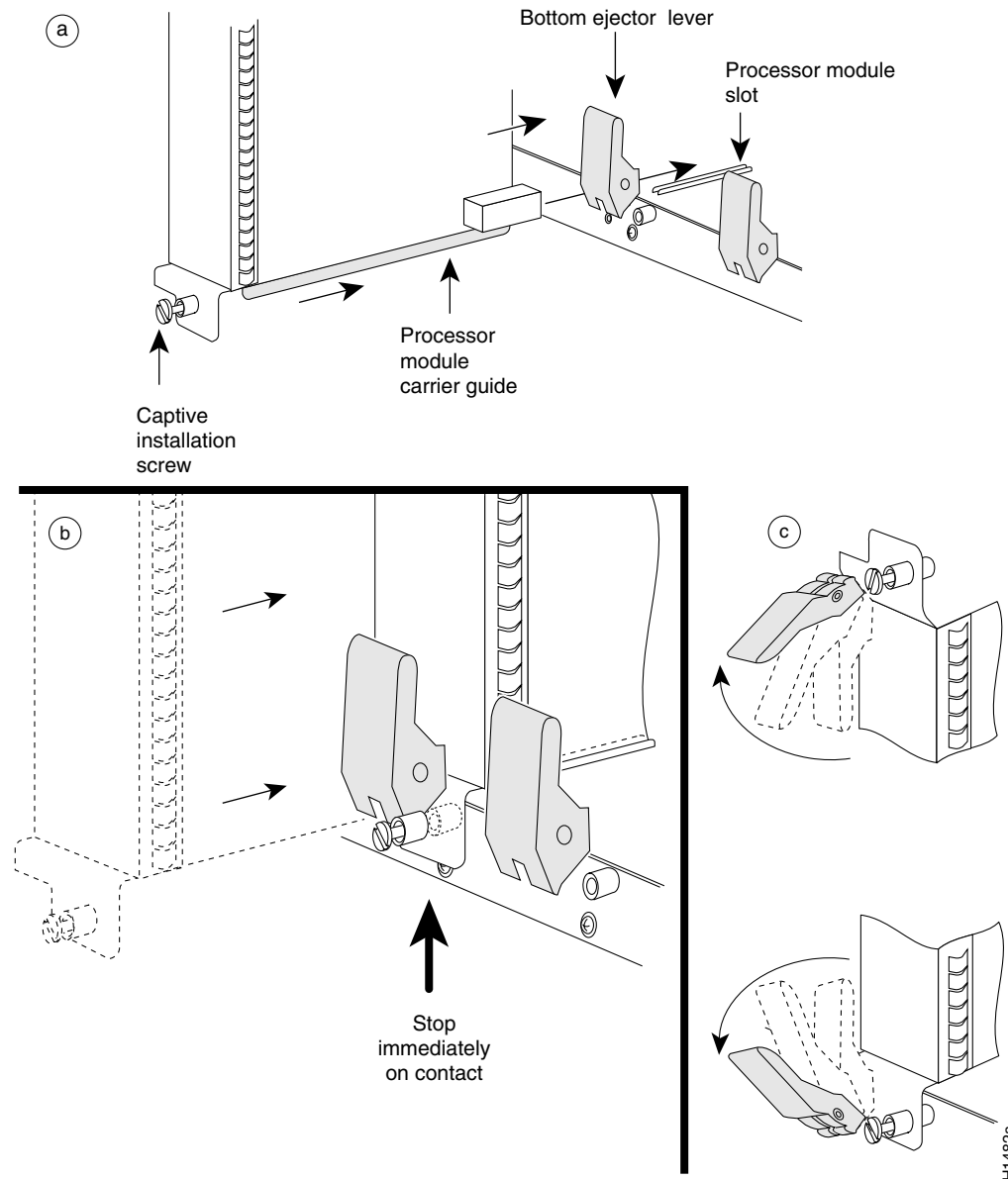




Figure 3 shows a detail of the ejector lever mechanism on the ends of the VIP.

**Figure 3** *Ejector Levers and Captive Installation Screws on the VIP6-80—Vertical Orientation Shown*



Proceed to either the “[Removing a VIP6-80](#)” section on page 18 to replace a VIP6-80 or to the “[Installing a VIP6-80](#)” section on page 24 to install a new VIP6-80.

To install or remove a port adapter, see the “[Removing and Installing Port Adapters](#)” section on page 19.

# Removing a VIP6-80

This section describes the procedure for removing a VIP6-80.



## Caution

If your router has an RSP2 as the standby with the high system availability (HSA) feature or high availability (HA) features enabled, online insertion and removal of any interface processor in either CyBus might cause the standby RSP2 to reboot with a bus error or a processor memory parity error. The active RSP recovers from this event and issues a “cBus Complex Restart” message. Systems that are configured with an RSP4/4+, an RSP8, or an RSP16 as the system standby are not affected and do not experience this problem. For more information on HSA or HA, refer to your RSP installation and configuration guide.

If your router has an RSP2 as the standby with the HSA feature or HA features enabled, perform the following steps before proceeding with the VIP6-80 removal:

- Step 1** Attach an ESD-preventive wrist strap between you and an unpainted chassis surface.
- Step 2** Remove the standby RSP2.
- Step 3** Wait 20 to 30 seconds. This time will vary depending on the number of interfaces installed on your system.

This completes the additional steps you must perform if you have an RSP2 configured as the standby with HSA or HA enabled. Continue with the following steps to finish the removal of the VIP6-80 from the router.

Perform the following steps to remove a VIP6-80 from your router:

- Step 1** Attach an ESD-preventive wrist strap between you and an unpainted chassis surface, if you have not already done so.
- Step 2** Disconnect all cables from the VIP6-80 port adapter interface ports.
- Step 3** Use a screwdriver to loosen the captive installation screws at both ends of the board. (See [Figure 3a.](#))



## Caution

Always use the ejector levers to remove a VIP6-80. Failure to do so can cause erroneous system error messages indicating a board failure.

- Step 4** Place your thumbs on the ejector levers and simultaneously pull both of the ejector levers outward (in the direction shown in [Figure 3a](#)) to release the board from the backplane connector.
  - Use the board’s handle to carefully pull it straight out of the slot, keeping your other hand under the carrier to guide it. (See [Figure 3c.](#)) Keep the board parallel to the backplane.
  - If you removed a VIP6-80 or interface processor and the interface processor slot is to remain empty, install an interface processor filler (Product Number MAS7K-BLANK=) to keep dust out of the router, maintain proper airflow inside the router, and ensure compliance with EMI approvals by providing a tight EMI-preventive seal. *Do not* leave the interface processor slot open.

**Step 5** Place the removed board on an antistatic mat or foam pad, or place it in an antistatic container if you plan to return it to the factory.

---

This completes the procedure for removing a VIP6-80. Proceed to the [“Installing a VIP6-80” section on page 24](#).



**Note** If you have an RSP2 configured as the standby with HSA or HA enabled, continue with the following steps to finish the removal of the VIP6-80 from the router.

---

**Step 1** Wait 20 to 30 seconds. This time will vary depending on the number of interfaces installed in your system.

**Step 2** Reinsert the standby RSP2.

---

This completes the procedure for removing a VIP6-80 if you have an RSP2 configured as the standby RSP with HSA feature or HA features enabled. Proceed to the [“Installing a VIP6-80” section on page 24](#).

## Removing and Installing Port Adapters

This section describes how to remove and install port adapters. It includes the following sections:

- [Tools and Parts Required, page 19](#)
- [Single-Width Port Adapter, page 20](#)
- [Dual-Width Port Adapter, page 22](#)
- [Connecting Cables to the Port Adapter, page 24](#)

If you are not removing or installing a port adapter, proceed to the [“Installing a VIP6-80” section on page 24](#).

Port adapters do not support OIR, so you must first remove the VIP6-80 before removing or installing the PA. Refer to the [“Removing a VIP6-80” section on page 18](#) if you have not already removed the VIP6-80.

## Tools and Parts Required

To remove or install a port adapter, you need the following tools and parts:

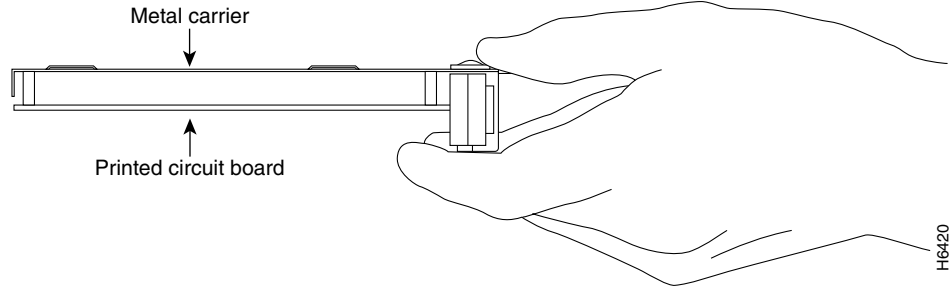
- A new port adapter or a replacement port adapter (if replacing a failed port adapter, you should have an antistatic container for shipment back to the factory)
- An ESD-preventive wrist strap between you and an unpainted chassis surface
- Number 1 Phillips screwdriver



**Note** Always handle the port adapter by the carrier edges and handle; never touch the port adapter components or connector pins. (See [Figure 4](#).)

---

**Figure 4** *Handling a Port Adapter*



## Single-Width Port Adapter

Single-width port adapters occupy one of the two port adapter slots on a VIP6-80. When a single-width port adapter slot is not in use, use a blank port adapter to fill the empty slot to allow the router to conform to EMI emissions requirements and to allow proper airflow through the router. If you plan to install a new single-width port adapter in a port adapter slot that is not in use, first remove the blank port adapter.

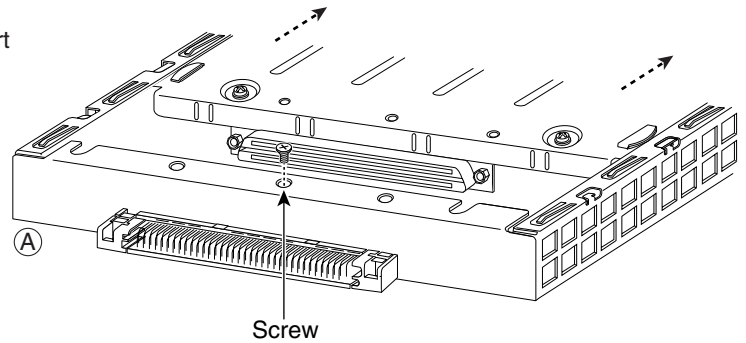
[Figure 5](#) describes the steps required to install a single-width port adapter.

**Figure 5** *Removing and Installing a Single-Width Port Adapter*

Note: You must first remove the VIP from the chassis before removing a port adapter from the VIP.

**Step 1**

To remove the port adapter, remove the screw that secures the port adapter (or blank port adapter). (See A.)

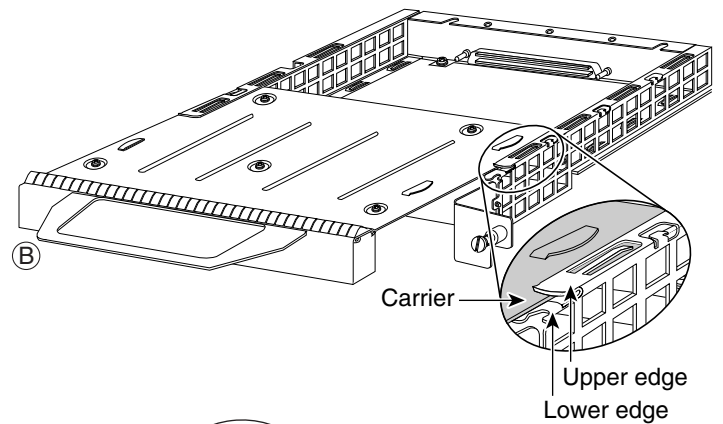


**Step 2**

With the screw removed, grasp the handle on the front of the port adapter (or blank port adapter) and carefully pull it out of its slot, away from the edge connector at the rear of the slot. (See A.)

**Step 3**

To insert the port adapter, carefully align the port adapter carrier between the upper and the lower edges of the port adapter slot. (See B.)

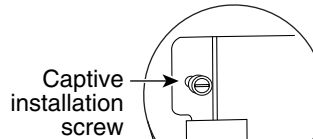


**Step 4**

Carefully slide the new port adapter into the port adapter slot until the connector on the port adapter is completely seated in the connector at the rear of the port adapter slot. (See B.)

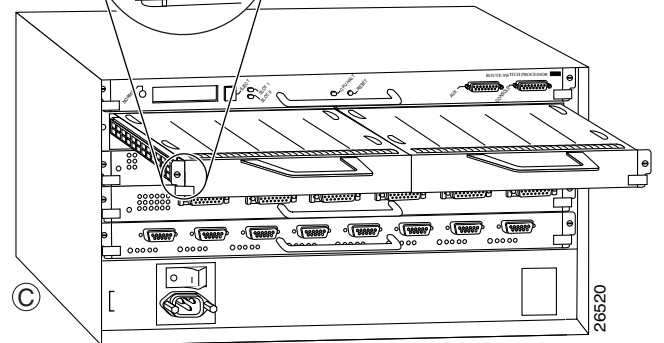
**Step 5**

Install the screw in the rear of the port adapter slot on the VIP. Do not overtighten the screw. (See A.)



**Step 6**

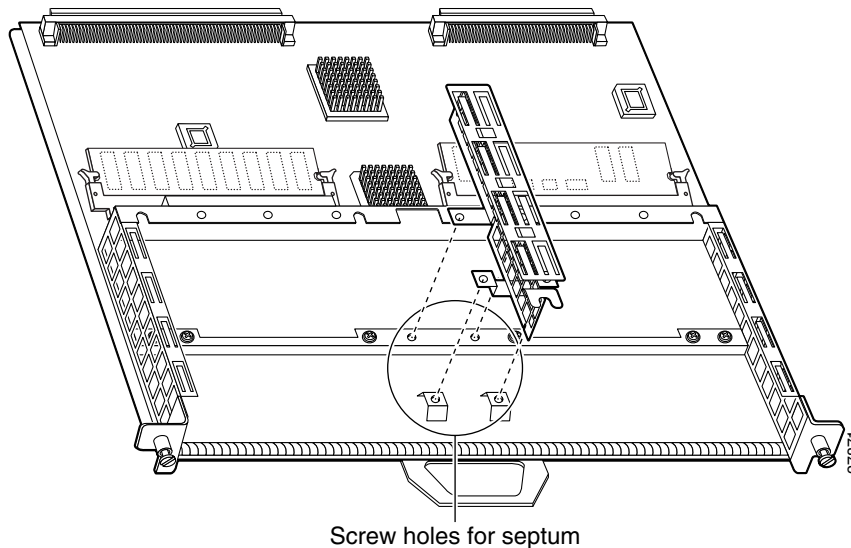
Carefully slide the VIP motherboard into the interface processor slot until the connectors at the rear of the VIP are completely seated in the connectors at the rear of the interface processor slot. Use the ejector levers to seat the VIP in the interface processor slot. Tighten the captive installation screws on the VIP. (See C.)



## Dual-Width Port Adapter

Dual-width port adapters occupy both port adapter slots on a VIP6-80. Before you can install a dual-width port adapter, first remove the slot divider located between the two port adapter slots. (See [Figure 6](#).) Refer to [Table 4](#) for a list of dual-width port adapters.

**Figure 6** Location of VIP6-80 Slot Divider and Screws



Use the following procedure to remove the slot divider from a VIP6-80:

- 
- Step 1** Use a number 1 Phillips screwdriver to remove the screw located at the rear of each port adapter slot (see [Figure 7](#)).
  - Step 2** Remove the four slot divider screws that secure the slot divider to the VIP6-80 motherboard. (See [Figure 6](#).)
  - Step 3** Remove the slot divider and store it (and the screws) in a location where you can retrieve it for use later.



---

**Note** If you need to reinstall the port adapter slot divider, place the slot divider in position on the VIP6-80 and secure it with the four Phillips screws.

---

- Step 4** See [Figure 7](#) for the steps to install or remove a dual-width port adapter.

**Figure 7** Removing and Installing a Dual-Width Port Adapter

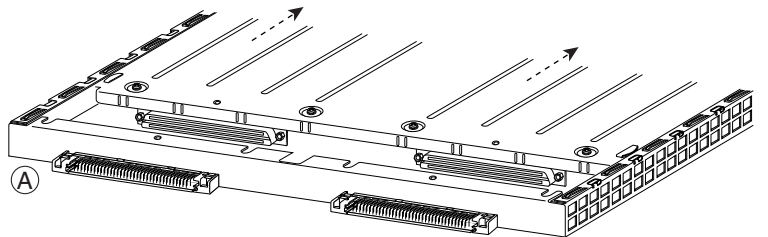
Note: You must first remove the VIP from the chassis before removing the dual-width port adapter from the VIP.

**Step 1**

To remove the port adapter, remove the screws that secure the port adapter to the VIP.

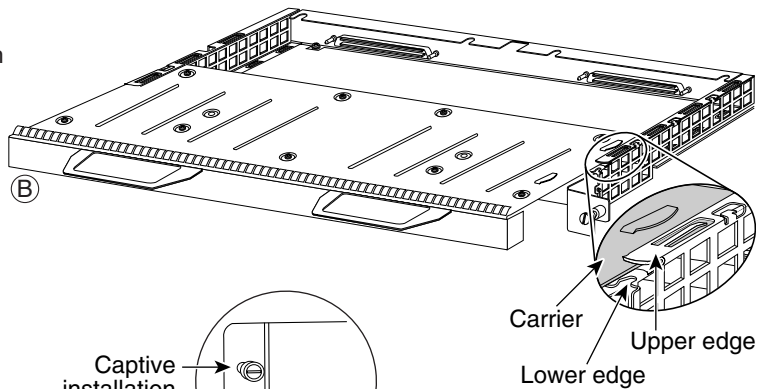
**Step 2**

With the screws removed, grasp the handles on the front of the port adapter and carefully pull it out of its slot, away from the edge connector at the rear of the slot. (See A.)



**Step 3**

To insert the port adapter, carefully align the port adapter carrier between the upper and the lower edges of the port adapter slot on the VIP. (See B.) Carefully slide the port adapter into the port adapter slot until the connectors at the rear of the port adapter are completely seated in the connectors at the rear of the port adapter slot.

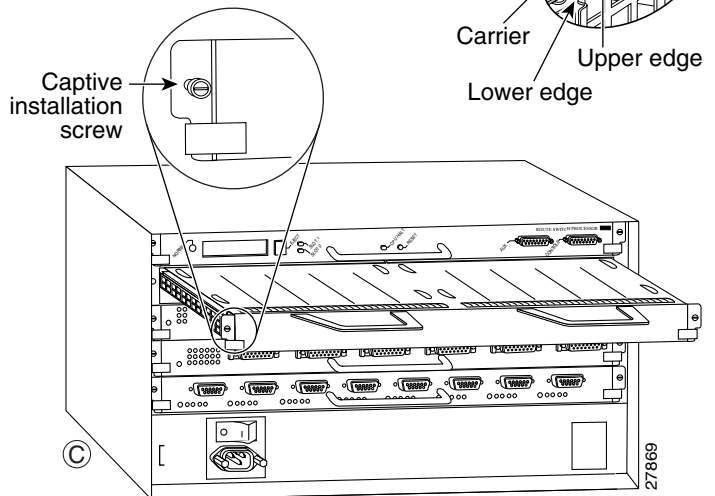


**Step 4**

Install the screws in the rear of the port adapter slot. Do not overtighten the screws.

**Step 5**

Carefully slide the VIP into the interface processor slot until the connectors at the rear of the VIP are completely seated in the connectors at the rear of the interface processor slot. Use the ejector levers to seat the VIP in the interface processor slot. Tighten the captive installation screws on the VIP. (See C.)



## Connecting Cables to the Port Adapter

Refer to the Installation and Configuration Guide that shipped with your specific port adapter for cabling instructions.

## Installing a VIP6-80

This section describes the procedure for installing a VIP6-80, or for inserting an interface filler.



### Note

To ensure compliance with EMI approvals by providing a tight EMI seal for the Cisco 7500 and the Cisco 7000 series routers, install interface processors first in the interface processor slots closest to the RSP slots, and then work out to the interface processor slots furthest from the RSP slots. Refer to the [“Product Description” section on page 3](#) for more information on the interface processor slots on your router.

If you removed a VIP6-80 and do not intend to replace it with another VIP in its slot, follow this procedure to insert an interface processor filler in the empty slot.

[Figure 3](#) shows the functional details of inserting the VIP6-80 and using the ejector levers. [Figure 2](#) shows proper handling of the VIP6-80 during installation.



### Caution

Remove or insert only one VIP6-80 at a time. Disrupting the sequence before the system has completed verification can cause the system to detect spurious hardware failures.

Use the following procedure to install a new VIP6-80:

- Step 1** Attach an ESD-preventive wrist strap between you and an unpainted chassis surface, if you have not already done so.
- Step 2** Ensure that a console terminal is connected to the console port (on the RSP or RSP7000) and that your console is turned on, or that you have a reliable Telnet connection to the system.
- Step 3** Hold the VIP6-80 handle with one hand and place your other hand under the carrier to support the VIP6-80 and guide it into the slot. (See [Figure 2](#).) Avoid touching the card or any connector pins.



### Caution

To prevent ESD damage, handle interface processors by the handles and carrier edges only, similar to that shown for port adapters in [Figure 4](#).

- Step 4** Place the back of the VIP6-80 in the slot and align the notch on the carrier with the groove in the slot. (See [Figure 3](#).)
- Step 5** While keeping the VIP6-80 parallel to the backplane, carefully slide it into the slot until the back of the faceplate makes contact with the ejector levers, and then *stop*. (See [Figure 3b](#).)



### Caution

Use the ejector levers when installing or removing interface processors. An interface processor that is partially seated in the backplane might cause the system to hang and subsequently crash, and shoving or slamming the interface processor into the slot can damage the backplane pins and board.



- 
- Step 6** Using your thumbs, simultaneously push both ejector levers inward until the VIP6-80 is pushed entirely into its slot. (See [Figure 3c](#).)
  - Step 7** Tighten both of the captive installation screws to ensure proper EMI isolation for the router.
  - Step 8** Repeat [Step 1](#) through [Step 7](#) to install any additional interface processors.
- 

This completes the procedure for installing a VIP6-80.

To configure the new interface, use the configuration section of the specific port adapter installation and configuration guide, or the Cisco IOS software configuration documentation listed in the [“Related Documentation” section on page 2](#). The documentation is available online on Cisco.com, and on the Documentation CD-ROM.

## Performing a Basic Configuration

After a VIP6-80 is reinstalled, the system brings online only port adapter interfaces that match the current configuration and were previously configured as up; all others require that you configure them with the **configure** command.

To configure the interfaces on the PAs installed on your VIP6-80, first enable the router as described below.

- 
- Step 1** At the user-level EXEC prompt, enter the **enable** command. The EXEC prompts you for a privileged-level password as follows:

```
Router> enable  
Password:
```

- Step 2** Enter the password (the password is case sensitive). For security purposes, the password is not displayed. When you enter the correct password, the system displays the privileged-level system prompt (#):

```
Router#
```

---

This completes the procedure for enabling the router.

For a complete description of commands and configuration options available for your VIP6-80, refer to the configuration section of the specific port adapter installation and configuration guide and to the appropriate Cisco IOS software configuration publications. (See the [“Related Documentation” section on page 2](#).)

# Checking the VIP6-80 Installation

This section describes the procedures you can use to verify your VIP6-80 installation, and includes information on the following topics:

- [Verifying the Installation, page 26](#)
- [Using show Commands to Verify the VIP6-80 Status, page 28](#)
- [Using show Commands to Display Interface Information, page 29](#)
- [Using the ping Command to Verify Network Connectivity, page 31](#)

## Verifying the Installation

This section describes how to verify the VIP6-80 installation by observing the port adapter LED states and the information displayed on your console terminal.



### Note

---

The VIP6-80 has no LEDs that are visible or usable when the VIP6-80 is installed. The port adapters you install on the VIP6-80 have status and interface LEDs.

---

When the system has reinitialized all interfaces, the enabled LED on the VIP6-80 port adapters should go on, depending on your connections and configuration. The console screen also displays a message as the system discovers each interface during its reinitialization.

The following sample display shows the events logged by the system as a VIP6-80 with a Gigabit Ethernet port adapter was removed from interface processor slot 2; the system then reinitialized the remaining interface processors and marked as *down* the Gigabit Ethernet interface on the VIP6-80 that was removed from slot 2. When you reinsert the VIP6-80, the system automatically brings up the interfaces that were up when the VIP6-80 was removed. (A Gigabit Ethernet interface is used in the following examples.)

## Removal

```
Router#
%OIR-6-REMCARD: Card removed from slot 2, interface disabled
%LINK-5-CHANGED: Interface GigabitEthernet2/0/0, changed state to administratively down
```

## Insertion

```
Router#
%OIR-6-INSCARD: Card inserted in slot 2, interface administratively shut down
%LINK-5-CHANGED: Interface GigabitEthernet2/0/0, changed state to up
```



### Note

---

When a new VIP6-80 is inserted or when a VIP6-80 is moved to a new slot, the system recognizes the new interfaces but leaves them in the *shutdown* state until you configure them and change their state to *up*.


---

The following sample display shows the events logged by the system as you insert a *new* VIP6-80 in interface processor slot 3. (A Gigabit Ethernet interface is used in the following example.)

```
Router#
%OIR-6-INSCARD: Card inserted in slot 3, interface administratively shut down
```

```
%LINK-5-CHANGED: Interface GigabitEthernet3/0/0, changed state to administratively down
```

Use the following procedure to verify that the VIP6-80 is installed correctly:

- 
- Step 1** Observe the console display messages and verify that the system discovers the VIP6-80, while the system reinitializes each interface, as follows:
- If you installed a new VIP6-80, the system should recognize all new interfaces but leave them configured as *down*.
  - If you replaced a VIP6-80, the system should recognize each interface and place it in the same state (*up* or *down*) each was in when you removed the VIP6-80.
- Step 2** Verify that the enabled LED on each port adapter goes on and remains on after the reinitialization is complete. If the enabled LED remains on, proceed to [Step 5](#). If it does not, proceed to [Step 3](#).
- Step 3** If the enabled LED on a port adapter fails to go on, the VIP6-80 may not be fully seated. Loosen the captive installation screws, and firmly push both ejector levers into place until they are approximately in the same orientation as the VIP6-80 faceplate. Tighten the captive installation screws. After the system reinitialization, the enabled LED on the port adapter should go on and remain on. If it does, proceed to [Step 5](#). If it does not, proceed to [Step 4](#).
- Step 4** If the enabled LED still fails to go on, remove the VIP6-80 and install it in another available interface processor slot.
- If the enabled LED goes on, suspect a failed backplane port in the original interface processor slot.
  - If the enabled LED still fails to go on, but other LEDs on the VIP6-80 PAs go on to indicate activity, proceed to [Step 5](#) to resume the installation checkout; suspect that the enabled LED on the PA has failed. Contact a service representative to report the problem and obtain further instructions.
  - If no LEDs on the VIP6-80 port adapters go on, suspect a faulty VIP6-80. Contact a service representative to report the problem and obtain further instructions.
  - If the enabled LED still fails to go on, remove the VIP6-80 and ensure the port adapters are firmly installed in their port adapter slots. Remove and reinstall them accordingly.
- Step 5** If the VIP6-80 is new and not a replacement, configure the new interfaces using the configuration section of your port adapter installation and configuration guide.
-  **Note** New interfaces are not available until you configure them.
- 
- Step 6** If the VIP6-80 is a replacement, use the **show interfaces** *type interface-processor-slot-number/port-adapter-slot-number/interface-port-number* command or the **show controllers** command to verify the status of the interfaces. (See the “[Using show Commands to Verify the VIP6-80 Status](#)” section on page 28.)
- If you replaced a VIP6-80 with a new VIP6-80 with a greater number of interfaces (for example, if you replaced a VIP6-80 with a single port adapter with a VIP6-80 with two port adapters), the system recognizes the interfaces on the previously configured port adapter but does not recognize the additional port adapter interfaces. The new interfaces remain in the shutdown state until you configure them.
- Step 7** When the interfaces are up, check the activity of each interface by observing the status LEDs, which are described in the appropriate LED section of your port adapter installation and configuration guide.
- Step 8** If an interface LED fails to go on and a cable is connected to the interface port, check the cable connection and make certain it is properly seated in the connector.

---

**Step 9** Repeat [Step 1](#) through [Step 8](#) to verify that any additional VIP6-80s are properly installed.

---

This completes the VIP6-80 installation.

If you experience other problems that you are unable to solve, contact TAC (see the [“Obtaining Technical Assistance”](#) section on page 38), or a service representative for assistance.

To configure the new interface, use the configuration section of the specific port adapter installation and configuration guide, or the Cisco IOS software configuration documentation listed in the [“Related Documentation”](#) section on page 2. The documentation is available online on Cisco.com, and on the Documentation CD-ROM.

## Using show Commands to Verify the VIP6-80 Status

The following steps use **show** commands to verify that the new interfaces are configured and operating correctly.

---

- Step 1** Use the **show version** command to display the system hardware configuration. Ensure that the list includes the new interfaces.
- Step 2** Display all the current interface processors and their interfaces with the **show controllers** command. Verify that the new VIP6-80 appears in the correct interface processor slot.
- Step 3** Specify one of the new interfaces with the **show interfaces** *type interface-processor-slot-number/port-adapter-slot-number/interface-port-number* command and verify that the first line of the display specifies the interface with the correct slot number. Also verify that the interface and line protocol are in the correct state: up or down.
- Step 4** Display the protocols configured for the entire system and specific interfaces with the **show protocols** command. If necessary, return to configuration mode to add or remove protocol routing on the system or specific interfaces.
- Step 5** Display the running configuration file with the **show running-config** command. Display the configuration stored in the RSP NVRAM using the **show startup-config** command. Verify that the configuration is accurate for the system and each interface.

If the interface is down and you configured it as up, or if the displays indicate that the hardware is not functioning properly, ensure that the network interface is properly connected and terminated. If you still have problems bringing the interface up, contact a service representative for assistance.

---

This completes the procedure to verify that the new interfaces are properly configured, using the **show** commands.



**Note**

The outputs that appear in this document may not match the output you receive when running these commands. The outputs in this document are examples only.

---

## Using show Commands to Display Interface Information

This section describes using **show** commands to display interface information.

To display information about a specific interface, use the **show interfaces** command with the interface type and interface address in the format **show interfaces type interface-processor-slot-number/port-adapter-slot-number/interface-port-number**.

With the **show interfaces** command, use arguments such as the interface type and the interface address to display information about a specific interface only. The following example of the **show interfaces fastethernet** command shows information specific to a VIP6-80 with a Fast Ethernet port adapter (PA-2FE) installed; the VIP6-80 is installed in interface processor slot 1:

```
Router# show interfaces fastethernet 1/0/0
FastEthernet1/0/0 is up, line protocol is up
  Hardware is cyBus FastEthernet Interface, address is 0000.0c4c.8820 (bia 0000.0c4c.8820)
  Internet address is 192.168.36.4/28
  MTU 1500 bytes, BW 100000 Kbit, DLY 100 usec, rely 255/255, load 1/255
  Encapsulation ARPA, loopback not set
  Keepalive set (10 sec)
  Full-duplex, 100Mb/s, 100BaseTX/FX
  ARP type:ARPA, ARP Timeout 04:00:00
  Last input 00:00:00, output 00:00:00, output hang never
  Last clearing of "show interface" counters 01:25:25
  Queueing strategy:fifo
  Output queue 0/40, 0 drops; input queue 0/75, 0 drops
  5 minute input rate 1271000 bits/sec, 251 packets/sec
  5 minute output rate 470000 bits/sec, 83 packets/sec
    1703680 packets input, 532380667 bytes, 0 no buffer
    Received 4008 broadcasts, 0 runts, 0 giants, 0 throttles
    0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored
    0 watchdog, 0 multicast
    0 input packets with dribble condition detected
  566766 packets output, 260633463 bytes, 0 underruns
  0 output errors, 0 collisions, 0 interface resets
  0 babbles, 0 late collision, 0 deferred
  0 lost carrier, 0 no carrier
  0 output buffer failures, 0 output buffers swapped out
```

To display hardware information about all of the interface processors in your router, including the VIP6-80, use the **show controllers cbus** command.

Following is an example of the **show controllers cbus** command used with a Cisco 7500 series router:

```
Router# show controllers cbus
slot1:VIP6 RM7000B, hw 2.00, sw 22.20, ccb 5800FF30, cmdq 48000088, vps
8192
  software loaded from system
  IOS (tm) VIP Software (SVIP-DW-M), Experimental Version
  12.0(20020228:202448) [mssunil-vip6-conn_is
  ROM Monitor version 103.0
  POS1/0/0, applique is SONET
    gfreeq 48000178, lfreeq 480001C8 (4544 bytes)
    rxlo 4, rxhi 132, rxcurr 4, maxrxcurr 5
    txq 48001A80, txacc 48001A82 (value 63), txlimit 63
  FastEthernet1/1/0, addr 0050.739f.cd28 (bia 0050.739f.cd28)
    gfreeq 48000158, lfreeq 480001D0 (1536 bytes)
    rxlo 4, rxhi 161, rxcurr 4, maxrxcurr 5
    txq 48001A88, txacc 48001A8A (value 61), txlimit 61
slot4:VIP6 RM7000B, hw 2.03, sw 22.20, ccb 5800FF60, cmdq 480000A0, vps
```

To display hardware information about a specific interface on a VIP6-80 port adapter, append the *type* argument (**fastethernet**, **hssi**, and so forth) and the interface address argument (*interface-processor-slot-number/port-adapter-slot-number/interface-port-number*) to the **show controllers** command.

Following is an example of the syntax for this command for the interface on a PA-2FE port adapter installed in port adapter slot 1 of a VIP6-80 installed in interface processor slot 1 of a Cisco 7000 series or Cisco 7500 series router:

```
Router# show controllers fastethernet 1/1/0
```

To display the configuration of the system hardware (the number of each interface processor type installed), the software version, the names and sources of configuration files, and the boot images, use the **show version** (or **show hardware**) command.

Following is an example of the **show version** command used with a Cisco 7500 series router:

```
Router# show version
Cisco Internetwork Operating System Software
IOS (tm) RSP Software (RSP-JSV-M), Version 12.0(10r)S1, EARLY DEPLOYMENT
MAINTENANCE INTERIM SOFTWARE
TAC Support:http://www.cisco.com/cgi-bin/ibld/view.pl?i=support
Copyright (c) 1986-2002 by cisco Systems, Inc.
Compiled Fri 22-Mar-02 16:27 by ninahung
Image text-base:0x60010950, data-base:0x612A2000
```

```
ROM:System Bootstrap, Version 12.0(10r)S1, RELEASE SOFTWARE (fc1)
```

```
UUT uptime is 2 minutes
System returned to ROM by reload at 15:33:45 UTC Tue Mar 5 2002
System image file is "disk0:rsp-pv-mz.vip6-3.022802"
```

```
cisco RSP4+ (R5000) processor with 65536K/2072K bytes of memory.
R5000 CPU at 200Mhz, Implementation 35, Rev 2.1, 512KB L2 Cache
Last reset from power-on
G.703/E1 software, Version 1.0.
G.703/JT2 software, Version 1.0.
X.25 software, Version 3.0.0.
1 VIP6 RM7000B controller (2 FastEthernet).
1 GEIP controller (1 GigabitEthernet).
2 FastEthernet/IEEE 802.3 interface(s)
1 Gigabit Ethernet/IEEE 802.3 interface(s)
123K bytes of non-volatile configuration memory.
```

```
47040K bytes of ATA PCMCIA card at slot 0 (Sector size 512 bytes).
16384K bytes of Flash internal SIMM (Sector size 256K).
No slave installed in slot 7.
Configuration register is 0x0
```

```
WARNING:Chassis Interface not present
```

To determine specific hardware configuration information about a VIP6-80 installed in your system (including the amount of installed CPU and packet memory), use the **show diag slot** command.

Specific information is displayed, as shown in the following example of a VIP6-80 with a PA-2FE port adapter; the VIP6-80 is installed in interface processor slot 4:

```
Router# show diag 4
Slot 4:
  Physical slot 4, ~physical slot 0xB, logical slot 4, CBus 0
  Microcode Status 0x4
  Master Enable, LED, WCS Loaded
  Board is analyzed
  Pending I/O Status:None
```

```
EEPROM format version 1
VIP6 RM7000B controller, FRU:VIP6, HW rev 2.03, board revision B0
Serial number:24632085 Part number:73-3143-09
Test history:0x00 RMA number:00-00-00
Flags:cisco 7000 board; 7500 compatible
```

```
EEPROM contents (hex):
0x20:01 4E 02 03 01 77 DB 15 49 0C 47 09 00 00 00 00
0x30:58 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
```

```
Slot database information:
Flags:0x4 Insertion time:0x1C54 (00:02:56 ago)
```

```
Controller Memory Size:128 MBytes CPU SDRAM, 64 MBytes Packet SDRAM
```

```
PA Bay 0 Information:
Fast-Ethernet PA, 1 ports, 100BaseFX-ISL
EEPROM format version 1
HW rev 1.00, Board revision B0
Serial number:03538256 Part number:73-1690-04
```

```
PA Bay 1 Information:
Fast-Ethernet PA, 1 ports, 100BaseFX-ISL
EEPROM format version 1
HW rev 1.00, Board revision B0
Serial number:06685419 Part number:73-1690-04
```

```
--Boot log begin--
```

```
INFORMATION ABOUT THE UNIT UNDER TEST *****
Cisco Internetwork Operating System Software
IOS (tm) RSP Software (RSP-PV-M), Experimental Version 12.1(20020206:203420) [mssunil-vip6
122]
Copyright (c) 1986-2002 by cisco Systems, Inc.
Compiled Thu 07-Feb-02 09:05 by mssunil
Image text-base:0x60010958, data-base:0x6113A000
```



**Note**

In the preceding command output, the line that begins with *Controller Memory Size* shows the amount of memory installed on the VIP6-80. If you plan a memory upgrade, make a note of these indicated memory values, then compare them after you upgrade memory to verify the upgrade.

## Using the ping Command to Verify Network Connectivity

This section provides brief descriptions of the **ping** command. The **ping** command allows you to verify that an interface port is functioning properly and to check the path between a specific port and connected devices at various locations on the network. After you verify that the system and VIP6-80 have booted successfully and are operational, you can use this command to verify the status of the VIP6-80 interface ports. Refer to the publications listed in the [“Related Documentation” section on page 2](#) for detailed command descriptions and examples.

The **ping** command sends an echo request out to a remote device at an IP address that you specify. After sending a series of signals, the command waits a specified time for the remote device to echo the signals. Each returned signal is displayed as an exclamation point (!) on the console terminal; each signal that is not returned before the specified timeout is displayed as a period (.). A series of exclamation points (!!!!) indicates a good connection; a series of periods (.....) or the messages [timed out] or [failed] indicate that the connection failed.

Following is an example of a successful **ping** command to a remote server with the IP address 10.1.1.60:

```
Router# ping 10.1.1.60 <Return>
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echoes to 10.1.1.60, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/15/64 ms
Router#
```

If the connection fails, verify that you have the correct IP address for the server and that the server is active (powered on), and repeat the **ping** command.

For complete descriptions of interface subcommands and the configuration options available for VIP6-80-related interfaces, and which commands support VIP6-80 functionality, refer to the publications listed in the “[Related Documentation](#)” section on page 2.

## Maintenance Procedures

The following sections discuss maintenance procedures you might need for your VIP6-80 and port adapters:

- [Single Line Card Reload, page 32](#)
- [Upgrading VIP6-80 Memory, page 32](#)
- [Checking the VIP6-80 Memory Upgrade, page 36](#)

### Single Line Card Reload

Single Line Card Reload (SLCR) is a feature that speeds recovery of a failed router by reloading a failed line card without reloading other line cards on the network backplane. SLCR isolates the fault to a single Versatile Interface Processor (VIP6-80) or legacy interface processor card (Ips), and accelerates recovery time by reloading only the faulty VIP or Ips. Physical lines and routing protocols on the other line cards of the network backplane remain active. The system continues forwarding packets with minimal interruptions.

SLCR is disabled by default and needs to be manually configured. For more information on how to configure SLCR, refer to the *Cisco 7500 Single Line Card Reload* feature module at <http://www.cisco.com/univercd/cc/td/doc/product/software/ios120/120newft/120limit/120s/120s13/slcr.htm>.

### Upgrading VIP6-80 Memory

This section provides the guidelines and procedures for upgrading CPU memory (also called *program memory*) and packet memory on your VIP6-80.

To upgrade CPU memory on your VIP6-80, you must replace the SDRAM DIMM located in socket U1. To upgrade packet memory on your VIP6-80, you must replace the SDRAM DIMM located in socket U5. (See [Figure 1](#).) The default memory configurations for the VIP6-80 are 64 MB of CPU memory and 64 MB of packet memory.



#### Note

To upgrade CPU memory to 256 MB, use any allowable combination of CPU memory and packet memory. You do not need to have equal amounts of CPU memory and packet memory installed.



  
**Note**

In the output display of the **show diag** command (see [page 30](#)), the line that begins with *Controller Memory Size* shows the amount of memory installed on the VIP6-80. Make a note of these memory values, then compare them after you upgrade memory to verify the upgrade.

The following Cisco Systems memory spare and upgrade kits are compatible with the VIP6-80:

**Table 7** Memory Spare and Upgrade Kits

Product	Description
MEM-VIP6-64M-SD(=)	Memory spare option for VIP6-80 CPU memory <b>or packet memory</b>
MEM-VIP6-128M-SD(=)	Upgrades VIP6-80 CPU memory from 64 to 128 MB, with one 128-MB SDRAM DIMM
MEM-VIP6-256M-SD(=)	Upgrades VIP6-80 CPU memory from 64 to 256 MB, or from 128 MB to 256 MB, with one 256-MB SDRAM DIMM (This 256-MB memory option is for CPU memory only.)

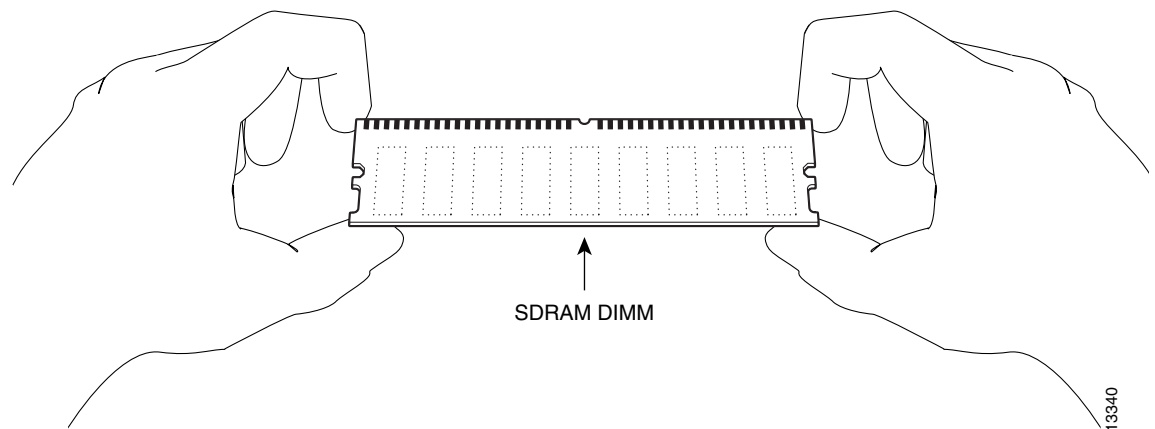
Depending on your system configuration, a memory upgrade might be required. Also, if a system problem is determined to be caused by a DIMM, a DIMM replacement might be required.

[Figure 1](#) shows the locations of the CPU memory and packet memory SDRAM DIMMs on the VIP6-80.

  
**Caution**

Handle the DIMM by the card edges only, and avoid touching the memory module, pins, or traces (the metal *fingers* along the connector edge of the DIMM). (See [Figure 8](#).)

**Figure 8** Handling the DIMM



  
**Note**

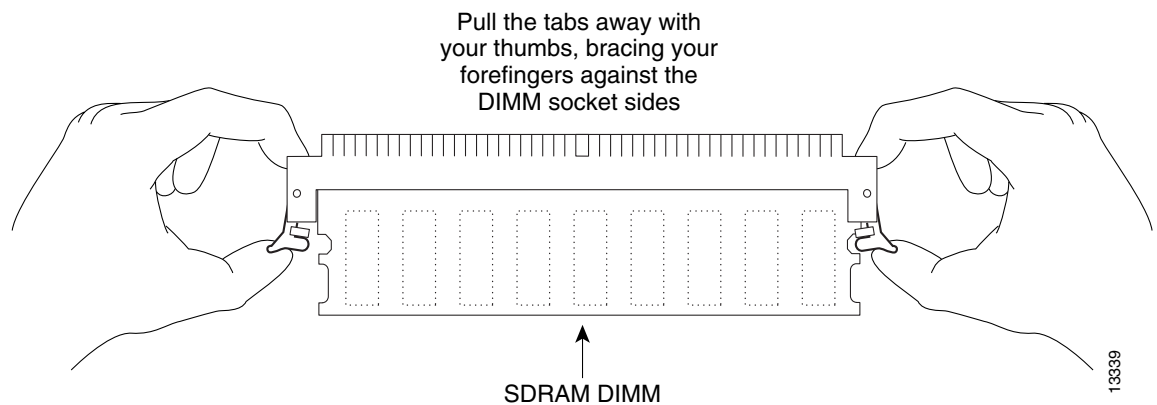
Use only SDRAM DIMMs from Cisco Systems. A Cisco manufacturing part number appears on each SDRAM DIMM.

## Removing SDRAM DIMMs

Use the following procedure to remove the existing DIMMs:

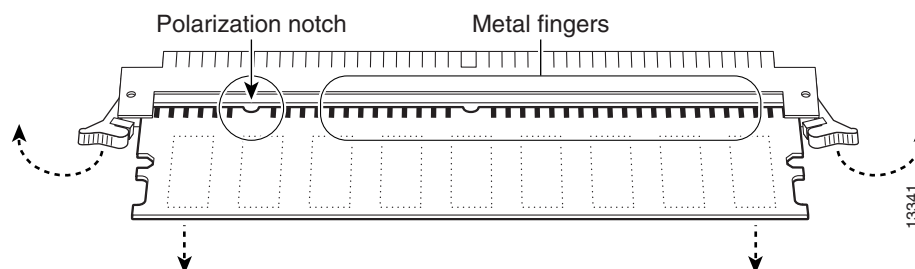
- Step 1** Turn off the system power and remove the VIP6-80 from the system. (Follow the steps in the “[Removing a VIP6-80](#)” section on page 18.)
- Step 2** Place the VIP6-80 on an antistatic mat or pad and ensure that you are wearing an antistatic device, such as a wrist strap.
- Step 3** Position the VIP6-80 so that the handles are away from you and the bus connectors are toward you—opposite of the position shown in [Figure 2](#).
- Step 4** Locate the DIMM and position the VIP6-80 so that you are facing the DIMM module you want to remove.
- Step 5** Open the DIMM socket tabs on the DIMM to release the DIMM from the socket. (See [Figure 9](#).) The DIMM is under tension in the socket; therefore, the DIMM might be released from the socket with some force.

**Figure 9** Opening the DIMM Socket Tabs



- Step 6** With the DIMM socket tabs open, grasp the ends of the DIMM between your thumbs and forefingers and pull the DIMM completely out of the socket. (See [Figure 10](#).)

**Figure 10** Removing the DIMM



- Step 7** Place a removed DIMM on an antistatic mat, and store it in an antistatic container to protect it from ESD damage.

**Step 8** Repeat [Step 4](#) through [Step 7](#) for the remaining DIMM, if required for your upgrade.

---

This completes the DIMM removal procedure.

## Installing SDRAM DIMMs

With the VIP6-80 handle away from you and the bus connector toward you, use the following procedure to install the new DIMM in the DIMM socket:

**Step 1** Remove the new DIMM from its antistatic container.

**Step 2** Hold the DIMM between your thumbs and forefingers. (See [Figure 8](#).)



**Note** The 64-MB DIMM should be facing component-side down.

---

**Step 3** Insert the connector edge of the DIMM straight into the socket.



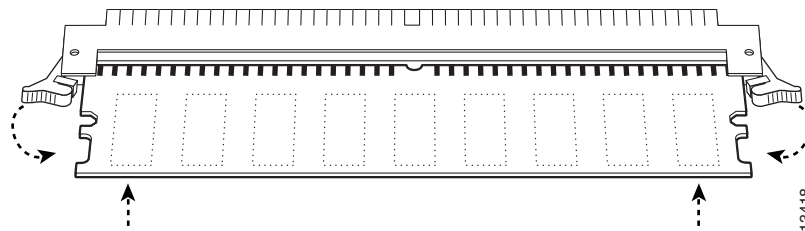
**Caution**

When inserting the DIMM, use firm but not excessive pressure. If you damage a socket, you will have to return the VIP6-80 to the factory for repair.

---

**Step 4** Gently push the DIMM into the socket until the socket tabs close over the ends of the DIMM. (See [Figure 11](#).) If necessary, rock the DIMM gently back and forth to seat it properly.

**Figure 11** Inserting the DIMM



**Step 5** Check to see if the DIMM is seated properly. If the DIMM appears misaligned, carefully remove it and reseat it in the socket. Push the DIMM firmly back into the socket until first one and then the other socket tab moves into place.

**Step 6** Repeat [Step 1](#) through [Step 5](#) above if you are replacing more than one DIMM.

---

This completes the DIMM replacement procedure. Reinstall the VIP6-80 in the system. (Follow the steps in the “[Installing a VIP6-80](#)” section on [page 24](#).) See the following section, “[Checking the VIP6-80 Memory Upgrade](#),” as required.

## Checking the VIP6-80 Memory Upgrade

This section describes how you would verify the memory upgrade.

- Observe the LED states and the console display. As the system reinitializes the interfaces, the enabled LEDs on the VIP6-80 PAs should go on. (Port adapter status LEDs might be on, depending on your connections.) The console screen also displays a message as the system discovers each interface during its reinitialization.
- Use the **show diag** command to verify that the system recognizes the new memory; check the line of the **show diag** command output (see [page 30](#)) that begins with *Controller Memory Size*.
- If the system fails to boot properly, if the console terminal displays a checksum or memory error, or if the **show diag** command output indicates an incorrect amount of memory (or no memory), check the following:
  - Ensure that all memory devices are installed correctly. If necessary, shut down the system and remove the VIP6-80. Check the memory devices by looking straight down on them and then at eye level. The devices should be aligned at the same angle and the same height when properly installed. If a memory device appears to stick out or rest in the socket at a different angle from the others, remove the device and reinsert it; then replace the VIP6-80 and reboot the system for another installation check.
  - Each DIMM socket must contain a DIMM of the correct size and speed or the system cannot operate. To ensure this, use only memory devices that are included with Cisco Systems memory kits.
  - See the “[Checking the VIP6-80 Installation](#)” section on [page 26](#).
- If after several attempts the system fails to restart properly, contact TAC (see the “[Obtaining Technical Assistance](#)” section on [page 38](#)), or a service representative for assistance. Before you call, make note of any error messages, unusual LED states, or any other indications that might help solve the problem.

This completes the VIP6-80 memory upgrade verification.

## Troubleshooting

This section includes information on VIP6-80 troubleshooting.

To troubleshoot the VIP6-80, refer to *Troubleshooting VIP Crashes* online at [http://www.cisco.com/warp/customer/63/vip\\_crash.html](http://www.cisco.com/warp/customer/63/vip_crash.html) (which requires user registration to access). To become a registered user, refer to <http://www.cisco.com/register/>.

Listed below are commonsense guidelines to troubleshoot the router, the VIP6-80 and its memory components, and the port adapter installation:

- Verify that the router is plugged in.
- Visually inspect the routers, the port adapters, and the VIP6-80 and its components to confirm that they appear to be in working order. Check to see that the LEDs are lighting up.
- Remove and reinstall the VIP6-80 to reseal it. Proceed to either the “[Removing a VIP6-80](#)” section on [page 18](#) to replace a VIP6-80 or to the “[Installing a VIP6-80](#)” section on [page 24](#) to install a new VIP6-80.
- If you replaced the SDRAM DIMMs, remove and reinstall them to reseal them. See the “[Upgrading VIP6-80 Memory](#)” section on [page 32](#).

- Remove and reinstall the port adapters. See the “[Removing and Installing Port Adapters](#)” section on [page 19](#).

## Obtaining Documentation

Cisco provides several ways to obtain documentation, technical assistance, and other technical resources. These sections explain how to obtain technical information from Cisco Systems.

### Cisco.com

You can access the most current Cisco documentation on the World Wide Web at this URL:

<http://www.cisco.com/univercd/home/home.htm>

You can access the Cisco website at this URL:

<http://www.cisco.com>

International Cisco websites can be accessed from this URL:

[http://www.cisco.com/public/countries\\_languages.shtml](http://www.cisco.com/public/countries_languages.shtml)

### Documentation CD-ROM

Cisco documentation and additional literature are available in a Cisco Documentation CD-ROM package, which may have shipped with your product. The Documentation CD-ROM is updated regularly and may be more current than printed documentation. The CD-ROM package is available as a single unit or through an annual or quarterly subscription.

Registered Cisco.com users can order a single Documentation CD-ROM (product number DOC-CONDOCCD=) through the Cisco Ordering tool:

[http://www.cisco.com/en/US/partner/ordering/ordering\\_place\\_order\\_ordering\\_tool\\_launch.html](http://www.cisco.com/en/US/partner/ordering/ordering_place_order_ordering_tool_launch.html)

All users can order annual or quarterly subscriptions through the online Subscription Store:

<http://www.cisco.com/go/subscription>

### Ordering Documentation

You can find instructions for ordering documentation at this URL:

[http://www.cisco.com/univercd/cc/td/doc/es\\_inpk/pdi.htm](http://www.cisco.com/univercd/cc/td/doc/es_inpk/pdi.htm)

You can order Cisco documentation in these ways:

- Registered Cisco.com users (Cisco direct customers) can order Cisco product documentation from the Networking Products MarketPlace:

<http://www.cisco.com/en/US/partner/ordering/index.shtml>

- Nonregistered Cisco.com users can order documentation through a local account representative by calling Cisco Systems Corporate Headquarters (California, USA) at 408 526-7208 or, elsewhere in North America, by calling 800 553-NETS (6387).

## Documentation Feedback

You can submit comments electronically on Cisco.com. On the Cisco Documentation home page, click **Feedback** at the top of the page.

You can send your comments in e-mail to [bug-doc@cisco.com](mailto:bug-doc@cisco.com).

You can submit comments by using the response card (if present) behind the front cover of your document or by writing to the following address:

Cisco Systems  
Attn: Customer Document Ordering  
170 West Tasman Drive  
San Jose, CA 95134-9883

We appreciate your comments.

## Obtaining Technical Assistance

For all customers, partners, resellers, and distributors who hold valid Cisco service contracts, the Cisco Technical Assistance Center (TAC) provides 24-hour, award-winning technical support services, online and over the phone. Cisco.com features the Cisco TAC website as an online starting point for technical assistance.

### Cisco TAC Website

The Cisco TAC website (<http://www.cisco.com/tac>) provides online documents and tools for troubleshooting and resolving technical issues with Cisco products and technologies. The Cisco TAC website is available 24 hours a day, 365 days a year.

Accessing all the tools on the Cisco TAC website requires a Cisco.com user ID and password. If you have a valid service contract but do not have a login ID or password, register at this URL:

<http://tools.cisco.com/RPF/register/register.do>

### Opening a TAC Case

The online TAC Case Open Tool (<http://www.cisco.com/tac/caseopen>) is the fastest way to open P3 and P4 cases. (Your network is minimally impaired or you require product information). After you describe your situation, the TAC Case Open Tool automatically recommends resources for an immediate solution. If your issue is not resolved using these recommendations, your case will be assigned to a Cisco TAC engineer.

For P1 or P2 cases (your production network is down or severely degraded) or if you do not have Internet access, contact Cisco TAC by telephone. Cisco TAC engineers are assigned immediately to P1 and P2 cases to help keep your business operations running smoothly.

To open a case by telephone, use one of the following numbers:

Asia-Pacific: +61 2 8446 7411 (Australia: 1 800 805 227)

EMEA: +32 2 704 55 55

USA: 1 800 553-2447

For a complete listing of Cisco TAC contacts, go to this URL:

<http://www.cisco.com/warp/public/687/Directory/DirTAC.shtml>

## TAC Case Priority Definitions

To ensure that all cases are reported in a standard format, Cisco has established case priority definitions.

Priority 1 (P1)—Your network is “down” or there is a critical impact to your business operations. You and Cisco will commit all necessary resources around the clock to resolve the situation.

Priority 2 (P2)—Operation of an existing network is severely degraded, or significant aspects of your business operation are negatively affected by inadequate performance of Cisco products. You and Cisco will commit full-time resources during normal business hours to resolve the situation.

Priority 3 (P3)—Operational performance of your network is impaired, but most business operations remain functional. You and Cisco will commit resources during normal business hours to restore service to satisfactory levels.

Priority 4 (P4)—You require information or assistance with Cisco product capabilities, installation, or configuration. There is little or no effect on your business operations.

## Obtaining Additional Publications and Information

Information about Cisco products, technologies, and network solutions is available from various online and printed sources.

- The Cisco Product Catalog describes the networking products offered by Cisco Systems, as well as ordering and customer support services. Access the Cisco Product Catalog at this URL:  
[http://www.cisco.com/en/US/products/products\\_catalog\\_links\\_launch.html](http://www.cisco.com/en/US/products/products_catalog_links_launch.html)
- Cisco Press publishes a wide range of networking publications. Cisco suggests these titles for new and experienced users: Internetworking Terms and Acronyms Dictionary, Internetworking Technology Handbook, Internetworking Troubleshooting Guide, and the Internetworking Design Guide. For current Cisco Press titles and other information, go to Cisco Press online at this URL:  
<http://www.ciscopress.com>
- Packet magazine is the Cisco quarterly publication that provides the latest networking trends, technology breakthroughs, and Cisco products and solutions to help industry professionals get the most from their networking investment. Included are networking deployment and troubleshooting tips, configuration examples, customer case studies, tutorials and training, certification information, and links to numerous in-depth online resources. You can access Packet magazine at this URL:  
<http://www.cisco.com/go/packet>
- iQ Magazine is the Cisco bimonthly publication that delivers the latest information about Internet business strategies for executives. You can access iQ Magazine at this URL:  
<http://www.cisco.com/go/iqmagazine>

- Internet Protocol Journal is a quarterly journal published by Cisco Systems for engineering professionals involved in designing, developing, and operating public and private internets and intranets. You can access the Internet Protocol Journal at this URL:  
[http://www.cisco.com/en/US/about/ac123/ac147/about\\_cisco\\_the\\_internet\\_protocol\\_journal.html](http://www.cisco.com/en/US/about/ac123/ac147/about_cisco_the_internet_protocol_journal.html)
- Training—Cisco offers world-class networking training. Current offerings in network training are listed at this URL:  
<http://www.cisco.com/en/US/learning/index.html>


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